AMENDMENT TO THE CLAIMS:

1. (Currently Amended)

A method for designing an arm structure for a robot having an arm which can rotate vertically and forward over a prescribed angle around an axial line extending substantially between two shoulders, the method comprising:

selecting a vertical region in front of the robot to be accessed by the arm in a fully extended state, the location of the selected vertical region being determined with respect to a reference plane; ~~and~~

selecting ~~a length of the arm and~~ a height of the axis of rotation of the arm as a midway point between an upper end and a lower end of the selected region;

approximating an arcuate path of a free end of the arm caused by rotational motion of the arm in accessing the selected region with a straight line that passes through a position of the free end of the arm extending in a horizontal direction and a position of the free end of the arm for accessing the upper or lower end of the selected region, and

selecting a length of the arm so that a maximum error between a linearly approximated for-and-aft distance to the free end of the arm based on the straight line approximating the arcuate path of the free end of the arm and an actual for-and-aft distance to the free end of the arm based on the arcuate path of the free end of the arm is smaller than a prescribed maximum tolerated error ~~so that a range of rotational motion of the arm in accessing the selected region is covered by a range in which the fore-and-aft distance to the tip of the arm is linearly approximated by approximating a~~

~~path of the tip of the arm with a straight line, wherein the height of the axis of rotation is measured from the reference plane~~.

2. (Previously Presented)

A method for designing an arm structure for a robot according to claim 1, wherein a height of the axis of rotation of the arm is 910 mm, and the arm swings vertically at least by 240 mm at its free end both upward and downward from a horizontal line.

3. (Currently Amended)

A method for designing an arm structure for a robot according to claim 1 ~~claim 8~~, wherein the maximum ~~a maximum~~ tolerated error of the fore-and-aft distance of the free end of the arm is 15 mm, and the arm is at least 528 mm long, and swings at least ±27 degrees from a horizontal line.

4. (Currently Amended)

A method for designing an arm structure for a robot according to claim 1 ~~claim 8~~, wherein the maximum ~~a maximum~~ tolerated error of the fore-and-aft distance of the free end of the arm is 20 mm, and the arm is at least 422 mm long, and swings at least ±35 degrees from a horizontal line.

5. (Currently Amended)

A method for designing an arm structure for a robot according to claim 1 ~~claim 8~~, wherein the maximum ~~a maximum~~ tolerated error of the fore-and-aft distance of the free

end of the arm is 25 mm, and the arm is at least 365 mm long, and swings at least ±42 degrees from a horizontal line.

6. (Currently Amended)

An arm for a robot comprising:

an arm capable of being attached to a robot shoulder which can rotate vertically and forward over a prescribed angle around an axial line extending from the shoulder, wherein:

a height of the axis of rotation of the arm is about 910 mm, and the arm swings vertically at least by 240 mm at its free end both upward and downward from a horizontal line extending through the axis of rotation;

an arcuate path of a free end of the arm caused by rotational motion of the arm in accessing a selected vertical region of ±240 mm upward and downward from the horizontal line extending through the axis of rotation is approximated with a straight line that passes through a position of the free end of the arm extending in a horizontal direction and a position of the free end of the arm for accessing the upper or lower end of the selected region; and

a length of the arm is selected so that a maximum error between a linearly approximated for-and-aft distance to the free end of the arm based on the straight line approximating the arcuate path of the free end of the arm and an actual for-and-aft distance to the free end of the arm based on the arcuate path of the free end of the arm is smaller than a prescribed maximum tolerated error.

7. (Previously Presented)

An arm for a robot according to claim 6, wherein the arm is at least 365 mm long, and swings at least ±42 degrees from a horizontal line.

8. (Canceled)